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A SYNOPSIS OF THE OLD WORLD SPECIES OF *MURMIDIUS* LEACH (COLEOPTERA, COLYDIIDAE)

By H. E. Hinton, Ph.D., F.R.E.S.

(*Department of Entomology, British Museum (Natural History)*).

In this paper three new species of *Murmidius* are described, one from Rhodesia and two from Singapore. Of the seven species which have already been described five are neotropical, one, *M. ovalis* (Beck), is cosmopolitan, and one, *M. segregatus* Waterhouse, has been recorded only from Rodriguez Island. A key is given to all the Old World species, *M. ovalis* and *M. segregatus* are redescribed, and the latter is recorded for the first time in Ceylon, Malaya, and England.

A key to the Old World species of *Murmidius*.

1. Pronotum without lateral longitudinal sulci; only rarely with feebly developed submedian sulci. Elytra confusedly punctate, never with punctures arranged in rows. Prosternum with median carinae diverging anteriorly, particularly near apex; when only feebly diverging anteriorly they are confined to basal third or fourth . . . . . 2.

–. Pronotum always with distinct lateral longitudinal sulci; usually with well-developed submedian sulci. Elytra with punctures arranged in distinct rows. Prosternum with median carinae always parallel and present on basal two-thirds . . . . . 4.

2. Pronotum with apical marginal line confined to border of antennal cavities. Prosternum with median carinae present on basal three-fourths to four-fifths and near apex suddenly and strongly diverging. Mesosternum without a marginal line on middle of apex; sides with marginal line complete and distinct. Marginal line in front of hind femoral cavity absent or very short, indistinct, and not extending more than a fourth of distance to episternum. Rodriguez Is., Malaya, Ceylon, England *M. segregatus* Waterhouse.

–. Pronotum with apical marginal line extending towards middle on each side to a point beyond mesal margin of eye. Prosternum with median carinae confined to basal third or fourth and near apex not suddenly and strongly diverging. Mesosternum with apical marginal line complete and distinct; sides not margined. Marginal line in front of hind femoral cavity complete to metasternal episternum . . . . . 3.

3. Dorsal surface moderately dark rufo-piceous. Pronotum with some punctures near antennal cavities a third coarser than those of disk. Prosternum with median carinae rather inconspicuous and present on basal third. Sides of metasternum with punctures more or less uniform in size, without a group of coarse punctures. Singapore . . . *M. stoicus* sp. n.

–. Dorsal surface black to occasionally very dark rufo-piceous. Pronotum with punctures near antennal cavities never distinctly coarser than those of disk. Prosternum with median carinae moderately prominent and confined to basal fourth. Sides of metasternum with eight to twelve conspicuous, round, coarse punctures among fine ones. N. Rhodesia *M. hebrus* sp. n.

4. Body more or less parallel. Elytra with serial punctures of basal half of disk oval to elongate (one and a half to two times as long as broad). Mesosternum with apex completely margined though very finely so at middle. Singapore . . . . . *M. tydeus* sp. n.

–. Body broadly oval to feebly obovate. Elytra with serial punctures of basal half of disk round. Mesosternum with middle of apex not margined. Cosmopolitan . . . . . *M. ovalis* (Beck).

Murmidius segregatus Waterhouse.

1876. *Murmidius segregatus* Waterhouse, *Ann. Mag. nat. Hist.* (4) **18** : 114.

Length, 1·17–1·37 mm.; breadth, 0·73–0·95 mm. Body broadly oval and moderately strongly convex; dorsal surface moderately sparsely and inconspicuously clothed with fine, short (slightly longer than eye facets), suberect to recumbent, pale hairs. Cuticle strongly shining and moderately dark brownish-piceous (occasionally rufo-piceous); antennae and legs paler brownish-piceous to brownish-testaceous. *Head* above eyes finely margined; surface with microscopic punctures (about one-half as coarse as facets of eyes or less) which are separated by one and a half to three or even four diameters; surface between punctures smooth. Clypeus with fronto-clypeal suture very finely, shallowly impressed but distinct and complete; anterior margin very broadly and feebly rounded; surface with punctures like head but near anterior margin with punctures slightly coarser and much denser. *Pronotum* with broadest point, which is across base, twice as broad as long (0·54 mm. : 0·24 mm.), base broader than apex between antennal cavities (0·54 mm. : 0·35 mm.), and apex between antennal cavities six times as broad as an antennal cavity (0·35 mm. : 0·05 mm.). Sides nearly straight and finely, distinctly margined; base feebly bisinuate on each side; apex bordering antennal cavities margined like sides, this marginal line not extending even for a short distance along apex towards middle. Surface without trace of lateral sulci and only rarely with short, indistinct, submedian sulci; disk with punctures as coarse as, or very slightly coarser than, those of head and separated by one and a half to two diameters; along anterior margin with a single, rather irregular row of shallow, round to oval punctures which are as coarse as or slightly coarser than facets of eyes; on each side near antennal cavity with a moderately dense group of 9–15 similar coarse punctures; on each side about half-way to antennal cavity two or three coarse punctures extend posteriorly from apical margin and are sometimes more or less joined together to form a submedian sulcus; surface between all punctures smooth. *Elytra* three times as long as pronotum (0·84 mm. : 0·24 mm.). Near humeri with a moderately broad gibbous area. Surface confusedly punctate, without trace of serial punctures; punctures on an oval discal area near base sparser and finer than those of head; near apex and near sides with similar sparse punctures; elytra elsewhere with punctures slightly but distinctly coarser than those of pronotal disk and separated usually by one and a half to two diameters; surface between elytral punctures usually smooth but occasionally with a scarcely visible alutaceous microsculpture. *Prosternum* with median carinae present on basal three-fourths to four-fifths, moderately prominent, and feebly diverging anteriorly but near apex suddenly and strongly diverging anteriorly; carina in front of anterior coxa about as prominent as median carina and extending obliquely outwards in an almost straight line to near anterior margin; surface of middle of prosternum punctate like head and surface between median and coxal carinae slightly more coarsely and densely so. Mesosternum with apex broadly, feebly rounded and not margined immediately opposite apex of prosternal process; sides (together with lateral part of apex) distinctly margined; surface with punctures finer than those of prosternum and separated by three to six diameters. Metasternum with median longitudinal line complete but very indistinct and only visible in certain lights; surface punctate like mesosternum; side among microscopic punctures near episternum with about 20–25 round, deep punctures which are nearly as coarse as facets of eyes; surface in front of hind femoral cavity without a marginal line or with a very short, indistinct one near coxa. Abdomen with lateral carina (or stria) of first sternite extending in a broad curve to lateral margin at posterior fifth. Surface of

first sternite punctate like metasternal disk but with an occasional coarse puncture adjacent to lateral carina; surface of other sternites punctate like pronotal disk but without coarse punctures.

Specimens examined:—ENGLAND: 1, Cambridgeshire, Madingley Wood, xii.1831 (*Power*); 2, MALAYA: Temerloh, 21.vii., in stored rice; 1, CEYLON: Kalutara, 29.v.1930, *ex* aurack vat (*M. P. D. Pinto*). The holotype has also been examined.

Murmidius stoicus sp. n.

Length, 1·12 mm.; breadth, 0·71 mm. Body obovate and strongly convex; dorsal surface moderately sparsely and inconspicuously clothed with fine, short (slightly longer than eye facets), recumbent, pale hairs. Cuticle strongly shining and moderately dark rufo-piceous; antennae and legs brownish-piceous. *Head* with margins above eyes strongly and narrowly flexed upwards, this flexed part extending to fronto-clypeal suture; surface with punctures slightly more than half as coarse as facets of eyes and separated by one to two diameters; surface between punctures smooth. Clypeus with fronto-clypeal suture very finely but distinctly impressed and complete; anterior margin very broadly rounded; surface sculptured like head but near anterior margin with punctures distinctly denser. *Pronotum* with broadest point, which is across base, more than twice as broad as long (0·54 mm.: 0·24 mm.), base broader than apex between antennal cavities (0·54 mm.: 0·35 mm.), and apex between antennal cavities more than five times as broad as an antennal cavity (0·35 mm.: 0·068 mm.). Sides nearly straight and finely, distinctly margined; base feebly bisinuate on each side of middle; apex bordering antennal cavities margined like sides, this marginal line extending towards middle along apex to a point slightly beyond mesal margin of eye. Surface without trace of sulci or other impressions; discal punctures similar to those of head but becoming coarser near antennal cavities where they are sometimes two-thirds to three-fourths as coarse as facets of eyes. *Elytra* three times as long as pronotum (0·90 mm.: 0·24 mm.). Near humeri scarcely noticeably gibbous (one specimen has on basal margin on each side near humerus a short, low, very fine, longitudinal fold). Surface confusedly punctate, without trace of serial punctures; punctures on basal part of disk slightly but distinctly coarser than those of pronotal disk and separated by one and a half to two diameters; surface between punctures smooth; middle discal region near suture with a large oval area which is only microscopically and very sparsely punctate; punctures becoming finer and sparser towards sides and very near apex. *Prosternum* with median carinae confined to basal third, rather inconspicuous, and feebly diverging anteriorly; carina in front of anterior coxal cavity more prominent than median carina and extending in an oblique and almost straight line to a point near anterior margin; surface of middle of prosternum punctate like basal discal part of elytra but slightly more sparsely and finely so; surface between median and coxal carinae similarly punctate but also finely, transversely alutaceous. Mesosternum with apex broadly, feebly rounded and finely, completely margined; sides not margined; surface with punctures slightly finer than those of head and separated by two to four diameters. Metasternum with median longitudinal line not distinctly impressed, more or less complete, and only visible in certain lights; disk more finely and sparsely punctate than mesosternum; sides with punctures slightly denser and coarser (some punctures being nearly as coarse as those of elytra) but without the usual group of round, coarse punctures; marginal line anterior to hind femoral cavity very fine and complete to metasternal episternum. Abdomen with lateral carina (or stria) of first sternite extending in a broad curve to lateral margin at posterior fifth. Surface of sternites rather evenly and nearly as coarsely and densely punctate as base of elytra.

Type: In the British Museum (Natural History). SINGAPORE, 17.iii.1923, under bark (*C. J. Saunders*).

Paratypes: Two with same data as type.

Variations: All three specimens are very similar, but the short and very fine basal fold opposite the humeri is absent in the two paratypes.

Comparative notes: This species may be distinguished from *M. segregatus* Waterhouse as shown in the key given above. In addition it differs in having the punctures of the sides of the metasternum fine and uniform in size, whereas in *M. segregatus* there are here, among the usual fine punctures, about 20–25 round, deep punctures which are nearly as coarse as the facets of the eyes.

Murmidius hebrus sp. n.

Length, 1·23 mm.; breadth, 0·76 mm. Body obovate and strongly convex; dorsal surface moderately sparsely and inconspicuously clothed with fine, short (slightly longer than facets of eyes), recumbent, pale hairs. Cuticle strongly shining and black to very dark rufo-piceous; ventral surface only moderately dark rufo-piceous; antennae and legs brownish-piceous. *Head* with margins above eyes strongly and narrowly flexed upwards, this line extending to fronto-clypeal suture though very indistinct just before suture; surface with punctures about half as coarse as facets of eyes and usually separated by two diameters; surface between punctures smooth. Clypeus with fronto-clypeal suture very finely impressed but distinct and complete; anterior margin very broadly rounded; surface, particularly anteriorly, slightly more densely punctate than head. *Pronotum* at broadest point, which is across base, twice as broad as long (0·57 mm. : 0·29 mm.), base broader than apex between antennal cavities (0·57 mm. : 0·36 mm.), and apex between antennal cavities five times as broad as an antennal cavity (0·36 mm. : 0·068 mm.). Sides nearly straight and finely, distinctly margined; base feebly bisinuate; apex bordering antennal cavities margined like sides, this marginal line extending inwards on each side along apex to a point beyond mesal margin of eye. Surface without trace of sulci or other impressions; discal punctures slightly coarser and very slightly denser than those of head; punctures do not become coarser towards antennal cavities but near middle anterior margin there is an occasional coarser, rather indistinct puncture. *Elytra* three times as long as pronotum (0·95 mm. : 0·29 mm.). Near humeri not distinctly gibbous. Surface confusedly punctate, without trace of serial punctures; punctures on basal part of disk scarcely noticeably coarser than those of pronotal disk and slightly sparser; punctures on most of median part of elytra about a fourth or third coarser and usually separated by two diameters; surface between punctures smooth or nearly so; punctures on an oval area on middle of disk (highest part of elytra) much finer and sparser; punctures near sides and very near apex also finer and sparser. *Prosternum* with median carinae confined to basal fourth, moderately prominent, very feebly diverging anteriorly; carina in front of anterior coxal cavity as prominent as median and extending in an oblique and almost straight line to near anterior margin; surface of middle of prosternum punctate like head but very slightly more coarsely so; surface between median and coxal carinae similarly punctate but anteriorly with a few transverse alutaceous lines. Mesosternum with apex broadly, feebly rounded and finely, completely margined; sides not margined; surface with punctures slightly coarser than those of base of head and separated by two to four diameters. Metasternum with median longitudinal line complete and very finely, not distinctly impressed; disk distinctly more finely and sparsely punctate than mesosternum; sides with punctures slightly denser and also with 8–12 shallow, round punctures which are about one-third coarser; marginal line in front of hind femoral cavity fine, distinct, and complete. Abdomen with lateral carina or stria of first sternite extending in a broad curve to lateral margin at posterior fifth. Surface of sternites evenly punctate like pronotal disk but usually more sparsely so; without coarse punctures.

Type: In the British Museum (Natural History). AFRICA: N. Rhodesia, Congo–Zambesi watershed, 1928 (*H. S. Evans*).

Comparative notes: This species is very closely related to *M. stoicus* sp. n., but it may be distinguished as follows: (1) the dorsal surface is black to occasionally very dark rufo-piceous instead of moderately dark rufo-piceous; (2) the punctures near the antennal cavities are no coarser than those of pronotal disk, whereas in *M. stoicus* sp. n. they are frequently a third coarser; (3) the median carinae of the prosternum are moderately prominent and confined to basal fourth instead of rather inconspicuous and present on basal third; and (4) the side of the metasternum has from 8 to 12 round punctures which are distinctly coarser than others, whereas in *M. stoicus* sp. n. the lateral metasternal punctures are more or less uniform in size and there are no round and distinctly coarser punctures.

Murmidius tydeus sp. n.

Length, 1·1 mm.; breadth, 0·60 mm. Body subparallel and strongly convex; dorsal surface moderately sparsely and inconspicuously clothed with fine, short (slightly longer than eye facets), recumbent to suberect, pale hairs. Cuticle strongly shining and moderately dark rufo-piceous; antennae and legs paler and brownish-piceous. *Head* with margins above eyes strongly and narrowly flexed upwards; surface with punctures about one-half as coarse as facets of eyes and usually separated by two to four diameters. Clypeus with fronto-clypeal suture not visible; anterior margin evenly and very broadly rounded; surface with punctures near anterior margin slightly but distinctly coarser than those of head and separated by one to one and a half diameters. *Pronotum* at broadest point, which is across base, twice as broad as long (0·52 mm.: 0·23 mm.), base broader than apex between antennal cavities (0·52 mm.: 0·32 mm.), and apex between antennal cavities five times as broad as an antennal cavity (0·32 mm.: 0·068 mm.). Sides nearly straight and finely, distinctly margined; base feebly bisinuate on each side; border of antennal cavities margined like sides, elsewhere with apex not margined. Pronotum on each side beginning near mesal margin of antennal cavity with a broad shallow sulcus (two-thirds as broad as antennal cavity), which is narrowed caudally and extends two-thirds of distance to base; near middle and parallel to the latter is a much less distinct sulcus which appears to be formed by the joining together of 3–5 coarse punctures. Surface with discal punctures slightly but distinctly coarser than those of head (about two-thirds as coarse as facets of eyes) and separated by about two diameters; anterior half of pronotum with a number (14 ±) of round to oval punctures which are as coarse, or very nearly as coarse, as facets of eyes. *Elytra* nearly four times as long as pronotum (0·84 mm.: 0·23 mm.). Near humeri with a moderately broad, feebly gibbous area. Surface not striate but with punctures arranged in distinct rows; serial punctures on basal half of disk about as long as facets of eyes, moderately shallow, oval to elongate (one and a half to two times as long as broad), about one-fourth as broad as intervals, and separated longitudinally usually by one and a half to two or even more lengths; towards apex serial punctures become finer and even disappear. Intervals with a median, poorly defined row of sparse, microscopic punctures; between punctures surface is usually smooth. *Prosternum* with median carinae prominent, parallel, and extending to anterior third; carina in front of anterior coxal cavity nearly as prominent as median and extending in an oblique, almost straight line to near anterior margin; surface of middle of prosternum nearly as coarsely and densely punctate as base of pronotal disk; surface between median and coxal carinae more finely and sparsely punctate. Mesosternum with anterior margin strongly, broadly rounded and completely margined but with marginal line at middle very fine; sides completely and slightly more thickly

margined; surface with punctures as fine as those of head and separated by three to six diameters. Metasternum with median longitudinal line complete, shallowly impressed, and about as broad as an eye facet; disk punctate like mesosternum and with surface between punctures also smooth; at extreme side with about 14 round to feebly oval, shallow punctures which are nearly as large as eye facets; in front of hind femoral cavity with a fine, transverse marginal line which extends nearly to episternum. Abdomen with lateral carina (or stria) of first sternite extending in a broad curve to lateral margin at posterior fifth; surface of sternites punctate like head (more densely and slightly more coarsely than metasternal disk); second and third sternites with a median row of 4–6 coarse, round punctures (similar to those of sides of metasternum) which do not extend mesally to middle third.

Type: In the British Museum (Natural History). Singapore, ii.1922 (*C. J. Saunders*).

Comparative notes: *M. tydeus* sp. n. is the least oval member of the genus; and it is the only one which can be described as being subparallel. It belongs to the group of species which have the coarse punctures of the elytra arranged in definite rows. From its allies it may be distinguished by its oval to elongate instead of round serial punctures of the elytra and the complete instead of incomplete marginal line of the mesosternum.

Murmidius ovalis (Beck).

1817. *Hister ovalis* Beck, *Beitr. baier. Insektenfauna* : 7, t. 1, f. 1.
1821. *Murmidius ferrugineus* Leach, *Trans. Linn. Soc. Lond.* **13** : 41.
1829. *Ceutocerus advena* Schueppel, *in* E. F. Germar, *Ins. Spec. Novae* **1** : 85.

Length, 1·2–1·4 mm.; breadth, 0·71–0·93 mm. Body broadly oval, strongly convex; dorsal surface moderately sparsely and inconspicuously clothed with fine, short (slightly longer than facets of eyes), recumbent, pale hairs. Cuticle strongly shining and dark to moderately pale rufo-piceous. *Head* with margins above eyes strongly and narrowly flexed upwards, this flexed line extending to fronto-clypeal suture; surface with microscopic punctures (about one-third as coarse as facets of eyes) which are separated by two to four diameters. Clypeus with fronto-clypeal suture fine but distinct and complete; anterior margin broadly and feebly rounded, nearly truncate; surface more densely and slightly more coarsely punctate than head. *Pronotum* at broadest point, which is across base, twice as broad as long (0·65 mm. : 0·27 mm.), base broader than apex between antennal cavities (0·65 mm. : 0·41 mm.), and apex between antennal cavities five times as broad as an antennal cavity (0·41 mm. : 0·082 mm.). Sides feebly arcuate, nearly straight and finely, distinctly margined; base feebly bisinuate on each side; anterior margin finely margined opposite antennal cavities, elsewhere not margined. On each side from mesal anterior margin of antennal cavity is a shallow to moderately deep sulcus which extends one-half to two-thirds of distance to base; nearer middle and parallel to the latter is a less distinct sulcus formed by the joining together of two or three coarse punctures. Surface with discal punctures very slightly coarser and denser than those of head; in apical part of lateral sulcus and near anterior margin with a few round to oval, shallow punctures which are as coarse as or slightly coarser than facets of eyes; surface between punctures smooth. *Elytra* nearly four times as long as pronotum (1·06 mm. : 0·27 mm.). Near humeri with a moderately broad, feebly gibbous area. Surface without striae (very rarely with feebly impressed striae) but with punctures arranged in distinct rows; serial punctures usually round, occasionally slightly oval, as coarse as to one-fourth coarser than facets of eyes, and separated longitudinally usually by one and a half to two or even three diameters. Intervals sparsely, microscopically punctate, usually nearly smooth but sometimes alutaceous.

Prosternum with median carinae prominent, parallel, and present on basal two-thirds; carina in front of anterior coxal cavity extending obliquely outwards in an almost straight line to near anterior margin; surface of middle of prosternum as finely but more sparsely punctate than head; surface between median and coxal carinae with distinctly coarser punctures separated by two to three diameters. Mesosternum with apex broadly rounded and marginal line absent opposite apex of prosternal process; sides, as well as sides of apex, distinctly and finely margined; surface punctate like middle of prosternum. Metasternum with median longitudinal line finely impressed and complete; disk nearly flat and punctate like middle of prosternum; sides among fine punctures with 12–20 round, deep punctures which are slightly coarser than facets of eyes and are nearly contiguous to separated by two diameters; marginal line in front of hind femoral cavity absent or if present never extending more than one-half of distance to episternum. Abdomen with lateral carina (or stria) of first sternite extending in a broad curve to lateral margin at posterior fifth. Surface of sternites with punctures coarser and denser than those of metasternal disk; also with a few much coarser punctures adjacent to lateral carina of first sternite and forming transverse median rows at sides of sternites two to four.

Specimens examined: Europe, Africa (Nigeria), Japan, China, India (Assam), Australia.

I have examined seven specimens from N.W. Australia (4, Port Darwin: 3, Adelaide River) which differ from the European, African, and Oriental examples as follows: (1) their average size is slightly greater; (2) the elytra are distinctly but feebly striate, whereas in the specimens from other localities the elytra usually have no trace of striae and are only rarely with very indistinct striae; (3) the serial punctures on basal half of elytra in rows 3–7 are seldom separated by as much as one diameter; (4) the intervals of the elytra are frequently feebly and reticulately alutaceous instead of smooth; (5) the microscopic punctures of the elytral intervals are distinct and usually separated by two to five diameters instead of indistinct and much sparser; and (6) the transverse rows of coarse punctures on abdominal sternites two to four are complete, whereas in the specimens from other localities they are generally confined to lateral third.

NOTES ON SIMULIIDAE (DIPTERA)

By John Smart, Ph.D., F.R.E.S.

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The notes which follow are in the nature of a postscript to my paper on Simuliidae from British Guiana and the Lesser Antilles (Smart, 1940).

Simulium amazonicum Goeldi.

1905, *Os mosquitos no Para* : 138.

Goeldi stated in his original description that he had deposited a series of co-types in the British Museum. I did not have these before me when preparing the paper mentioned above. During the evacuation of the Diptera collections in 1941, on account of air raids, the tube containing Goeldi's co-types was found. The material is in spirit and, except for expected fading, in good condition. Since the material is in spirit a full redescription of the species cannot be prepared, but I give below some notes on certain characters that can be seen in the spirit material and which have some bearing on the subgeneric position of the species and its identification. All the specimens are females.

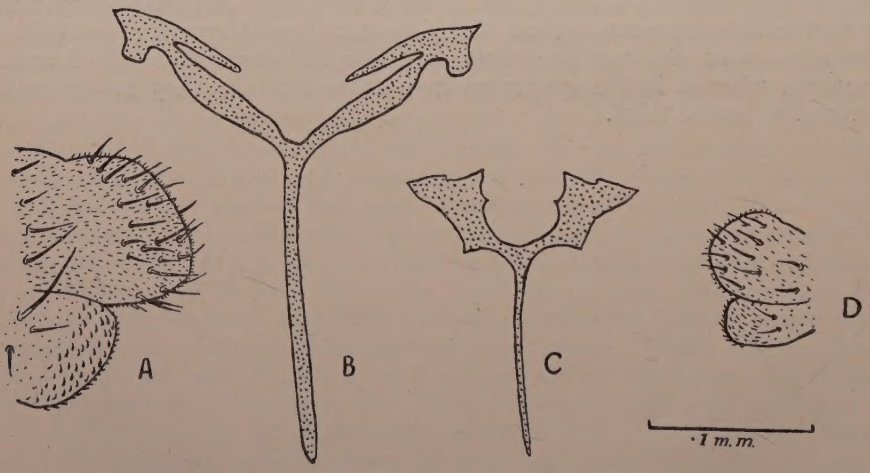

Fig. 1.—Female genitalia of *Simulium amazonicum* Goeldi and *Simulium guianense* Wise. A. *S. guianense*, tip of anal lobe and cercus; B. *S. guianense*, genital fork; C. *S. amazonicum*, genital fork; D. *S. amazonicum*, tip of anal lobe and cercus.

The thoracic pattern, as far as it can be seen in spirit material, corresponds almost exactly with the pattern figured by Porto (1939). The coloration of the hind leg is as figured by Lutz (1917). The pedisulcus and the calcipala are both present and the claws are simple (without a basal tooth). The wing is without a basal cell, the radius is not

forked and its basal sector is bare of hairs. The antennae have eleven segments. The tergites of the apical segments of the abdomen are shiny. The pleural tuft is present but there are no hairs on the membranous area of the pleuron. The female genitalia are now illustrated (fig. 1).

The re-examination of Goeldi's co-types, as far as it has been possible to carry it out, raises no doubts as to the correct recognition of this species by various workers. A slight emendation of my key (Smart, 1940) to the effect that the median dark stripe may reach the anterior margin of the dorsum of the thorax is called for, but this does not affect the use of the key for practical determinations.

The above descriptive notes are based on a series of 38 females in spirit accompanied by the following label in the handwriting of the late E. E. Austen: "*Simulium amazonicum*, Goeldi.—Co-Types, (The 'Piúm'.), Born Lugar, Rio Purús, Amazons Region, Brazil. May, 1904.—Dr. J. Huber. Pres. by Dr. E. A. Goeldi. (Recd. 6-vi-1905)", and a small label in an unknown hand, reading "Pium, Born Lugar, (Purus), v.1904." The material was unregistered and now has the registration no. B.M. 1941 : 19. Two of the specimens have been pinned and dried and two have been dissected and mounted in balsam on microscope slides. Since it is not clear whether Goeldi (*loc. cit.*) was using the term "co-type" *strictu sensu* or loosely, in the sense common with continental workers, as an equivalent of para-type, I refrain from selecting a lecto-holo-type. I have, however, marked the slide from which the present figure of the female genitalia was made. This plesio-co-type may be designated as the lecto-holo-type should it be considered that Goeldi was using the term "co-type" in its correct sense.

Simulium clavipes Malloch.

1914, ***U.S. Dept. Agric., Bur. Ent. (Tech.)*** **26 : 40.**

I carelessly overlooked this species from Guadeloupe when preparing the paper (Smart, 1940) referred to above. Pinto (1932), in his catalogue of the Simuliidae of Central and South America, also omitted it. The type series, which were all females, came from "Guadeloupe, West Indies, 4,000-foot level, July (*August Busck*)" and are presumably in the U.S. National Museum at Washington. It is not clear from Malloch's text whether the type series consists of one or more specimens.

I consider it to be a synonym of *Simulium tarsale* Williston which I deal with below.

Simulium guianense Wise.

1911, ***Timehri*** **(3) 1 : 252.**

The rarity of the work in which this species was originally described has led to its being ignored by many workers. I should have mentioned in my paper on the Simuliidae from British Guiana and the Lesser Antilles (Smart, 1940) that the original description was republished in 1912, *J. trop. Med. Hyg.* **15 :** 43, where it may be more accessible to some authors. In view of the fact that Fairchild (1940) has published figures of the female genitalia of several species of Simuliidae from Panama I give, herewith, a figure of the female genitalia (fig. 1) of *S. guianense* made from a specimen (plesio-homo-topo-type),

taken by myself in British Guiana, Sept. 1937, which had been compared with the type series before dissection and determined as conspecific. I suspect that *S. lugubre* Lutz (see below) may prove to be a synonym of *guianense* but cannot come to a conclusion on this point without having authenticated specimens of Lutz's species before me.

Simulium lugubre Lutz.

1928, *Estudios Zoologia Parasitologia venezolanas* : 46 (Rio de Janeiro).

Fairchild (1940) considers this species a synonym of *Simulium mexicanum* Bellardi. Although Lutz's textual description gives characters that enable *lugubre* to be separated from *guianense* Wise (Smart, 1940), the coloured figure of the former published by Lutz bears a remarkable resemblance to the latter species. There is also a general resemblance in the pupal filaments (*vide* Lutz's figure, *loc. cit.*) of the former species and my figure (Smart, 1940) of the filaments of the latter species, though the former are figured as longer than the latter.

Simulium ochraceum Walker.

1860, *Trans. ent. Soc. Lond.* (n.s.) **5** : 332.

Although this paper is mainly concerned with material supposed to be lodged in the British Museum, reported as missing and recently recovered, I regret that the type series of this species remains unknown to me.

Simulium quadrivittatum Loew.

1862, Dipt. Amer. Sept. II. *Berlin. ent. Z.* **6** : 186.

I have a letter (dated 30.vii.1940) from Mr. C. T. Parsons which reads as follows: "I notice in your recent paper that you state that the type of *Simulium quadrivittatum* Loew is possibly in Berlin. Like all of Loew's New World types, the type of *quadrivittatum* is in the Mus. Comp. Zoology. There are two cotypes on one pin, labelled 'Cuba, Gundlach'." I have to record my thanks to Mr. Parsons for this information.

Simulium tarsale Williston.

S. tarsale Williston, 1896, *Trans. ent. Soc. Lond.* **29** : 268.
S. tarsale Williston of Malloch, 1914, *U.S. Dept. Agric., Bur. Ent.* (*Tech.*) **26** : 46.
S. clavipes Malloch, 1914, *U.S. Dept. Agric., Bur. Ent.* (*Tech.*) **26** : 40.
S. tarsale Williston of Smart, 1940, *Trans. R. ent. Soc. Lond.* **90** : 9.

In my paper, cited above, I stated that the type series of this species, which should have been in the British Museum, was not to be found there. During the evacuation of the Diptera collections on account of air raids in 1941 the three specimens which constitute the type series were discovered. These three specimens ranked as co-types and the labels on them leave no doubt as to their authenticity. It would appear that these specimens, as well as a few other Nematocera from the same collection, were not put into the cabinets at the time when the bulk of the collection from St. Vincent was incorporated into the general collection of Diptera.

Williston in his description stated that there were three specimens. He described only the female. The legend for the plate on which appear the figures of the wing and fore leg of *S. tarsale* reads " fig. 25. *Simulium tarsale*, wing, 25a ♂ front tarsus." The three specimens before me now are undoubtedly all females and it would appear that the above legend, which is repeated in the figure citation in the text, is erroneous. The figure of the tarsus depicts all the characters exhibited by the tarsi of the females of the type series.

Although referred to by both Malloch (*loc. cit.*) and myself (*loc. cit.*) specimens of *tarsale* have not been recognised since it was originally described.

I have compared the type specimens of *tarsale* character for character with Malloch's description of *clavipes* (*loc. cit.*) and have no hesitation in sinking the latter name as a synonym of the former. Such differences as can be found between the descriptions of the two species as they were published are of such a kind as may be said to be entirely due to differences in the subjective conceptions of the two authors. The type series of *tarsale* all have the vestiture of upright brown hairs that Malloch described for *clavipes* and which he assumed *tarsale* lacked since Williston did not mention it; the abdomens of the type series of *tarsale* are all very shrunken, which accounts for the small size, " 2 mm.", stated by Williston.

The following characters are possessed by the type specimens though not mentioned by Williston. Antennae with 11 segments and a marked constriction between segments 2 and 3. Face and frons both matt. The brassy reflecting hairs that lie adpressed to the dorsum of the thorax are quite definitely hair like and are not completely reduced to the scale-like metallic structures found on some species. The wings have no basal cell, the radius is unforked and has the basal sector bare, and the cubitus is strongly bent. The coloration of the legs varies slightly from specimen to specimen. It would appear that in species of *Simulium* where the leg coloration does not consist of definite bands it is dangerous to rely overmuch on this character. In one co-type of *tarsale* the second tarsal segment of the hind leg would be described as " dark brown with the basal half pale," in another it is entirely dark brown. There is also a variation in the depth of the general pigmentation. Thus in one specimen the dorsal surface of the humeral region is paler than is the same region in the other two co-types. This lightening of the pigmentation is general and affects all the other pigmented parts. The pedisulcus and calcipala are present. The genitalia are not visible and I have preferred not to dissect them out at the present time. The species runs to the subgenus *Simulium* in Edwards's (1931) key; the examination of the co-types calls for no modification of my key (Smart, 1940); Malloch (*loc. cit.*) did not place *tarsale* in his key and the species will therefore run out to its synonym *clavipes*.

One of the co-types lacks a wing and is therefore presumably the one that was figured. I designate this specimen as the lecto-holo-type. The remaining two specimens therefore now rank as paratypes. All three are labelled as follows :—" Windward side St. Vincent, W.I., H. H. Smith, West Indies, 1907–66 " (1907–66 is the British Museum registration no.); the lecto-holo-type and one paratype are labelled " 1,000 feet " and the lecto-holo-type carries a ms. label " Forest, by stream, March " and Williston's determination label. I presume, however, that the data on the lecto-holo-type apply to all three specimens.

References.

Since the publication of my paper on Simuliidae from British Guiana and the Lesser Antilles four recent papers dealing with Neotropical Simuliidae have come to my notice ; they are marked * in the list of references given below.

Edwards, F. W., 1931, Simuliidae. *Dipt. Pat. S. Chile* **2** : 121–154. (Brit. Mus. (Nat. Hist.)).

*Fairchild, G. B., 1940, Notes on the Simuliidae of Panama. *Ann. ent. Soc. Amer.* **33** : 701–719.

*Lane, J., and Porto, C. E., 1939, Simulideos da regiao neotropica, o genero *Eusimulium*. *Bol. Biol.* (n.s.) **4** : 168–176.

Lutz, A., 1917, Terceira contribuicao para o conhecimento das especies brazileiras. O pium do norte (*Simulium amazonicum*). *Mem. Inst. Oswaldo Cruz* **9** : 63–67.

Pinto, C., 1932, Simulidae da America Central e do Sul (Diptera). *Sept. Reun. Soc. Argentina Pat. Reg. Norte* **2** : 661–763. Buenos Aires.

*Porto, C. E., 1939, Simulideos da regiao neotropica (II- genero *Simulium*). *Bol. Biol.* (n.s.) **4** : 369–373.

*——, 1940, Simulideos da regiao neotropica. *Rev. Mus. Paulista* **24** : 383–385.

Smart, J., 1940, Simuliidae from British Guiana and the Lesser Antilles. *Trans. R. ent. Soc. Lond.* **90** : 1–11.

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——. 1936, New species of Coccidae, *Trans. R. ent. Soc. Lond.* **84** : 901–936.

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